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WATER RUNNING UP-STREAM

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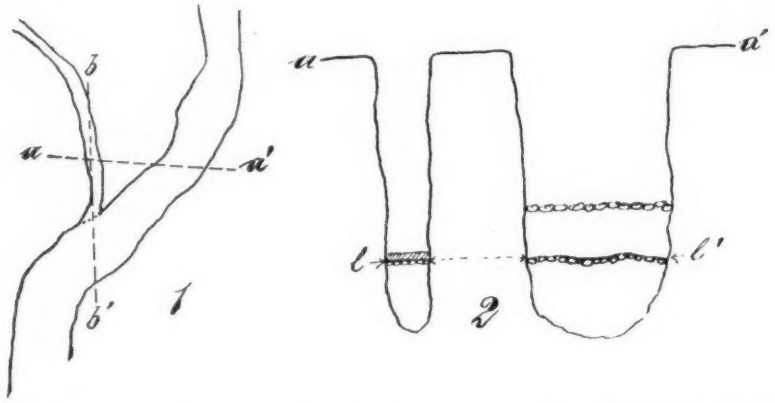
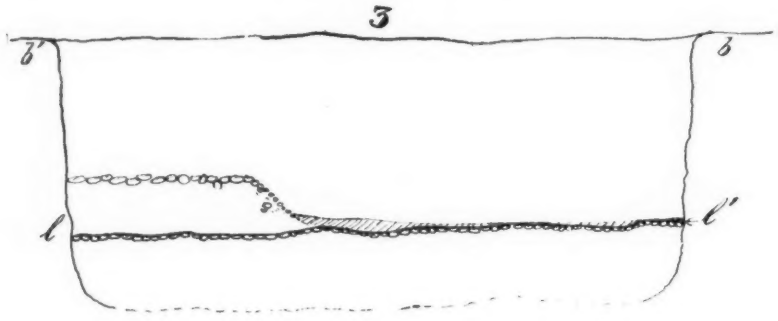
THE above title is not intended to be sensational, but to describe a condition which may occur, and, if we may depend on the evidence to be presented, has occurred in the desert not far from my former abode. It is not often that water runs at all there, and to find it taking such slender opportunity as it has to behave in an apparently inverse way was a surprise. The facts observed are topographical, or surface geological, if you please, and together offer a condition which could be brought about only where the rainfall is sudden and localized, and where the run-off is marked. When my notes were made I wished that I had a class of youngsters to set to the task of unraveling the evidence, but my teaching instinct had for the time to remain unsatisfied.

While resting in the shade of a six-foot vertical arroyo wall after a tramp through the hot sun, I found myself sitting opposite the juncture of two stream beds, both with vertical adobe walls. As I was looking up-stream, which I knew of course from the arrangement of the arroyo beds, I was struck by the fact that the bed of one of them, the smaller, was about two feet lower than that of the larger, on the gravel bed of which I sat. Closer examination showed that, leading from the surface of the larger stream-bed to that of the smaller was a steep incline of very regular form, like a talus slope with a horizontal and regular upper margin. The original gravel bed of the smaller arroyo was covered with silt to a depth of perhaps a foot, and this silt was to be found for a hundred yards up-stream but thinning out as one passed along, finally ceasing entirely. Here then is a case in which the bed of a tributary stream is deeper—and relatively very much deeper—than that of the main stream at the point of juncture. The explanation is of course simple. The larger arroyo drains a larger

area, separated from the basin drained by the smaller one. Heavy showers in the larger basin caused the carriage down-stream of a sufficient amount



of gravel to raise the bottom at the juncture two feet above that of the smaller stream bed. This on the other hand has brought down, if any, an insufficient amount of water to carry any heavy detritus. At the place where the two streams come together, there was formed a talus by the partial falling back of the gravel from the larger stream into the bed of



the smaller. When it rains in the basin of the larger stream, therefore, the water which comes down as far as the juncture of the two arroyos will flow for some distance up the smaller of the two, and thus we have water running up-stream. Of course, I am careful to say "up-stream," and not "up-hill," and the reader must forgive the word-trick.

The figures which are presented will make the details of the observation plain. A plan of the meeting place of the two stream-beds is given (Fig. 1) and a diagram of two sections, one made across the two arroyos (Fig. 2) and the other roughly parallel to the middle of the bed of the

smaller one, so as to show what I have called the talus slope leading down to this bed. The surface L,L′, is the gravel bed of the smaller arroyo, and probably at some time not so long ago—perhaps as short a time as a year, since very rapid changes occur in the desert—this bed had the same level as that of the larger.

GEOGRAPHY AT EDUCATIONAL MEETINGS

AT the present time the officers of many associations of teachers are busy making up the programs for the approaching meetings of their societies, to be held within the next few weeks. If the past programs are any indication of what the future programs will be, it is very probable that few program makers are even considering giving the teaching of geography any attention whatever. What a rare thing it is to have any emphasis given at such meetings to the problems of geography teaching, and yet geography is recognized—often grudgingly, to be sure—as one of the fundamental subjects in a school curriculum. Surely the progress in this field in the last decade and a half has been sufficient to prove that there is something yet to be learned about geography teaching, and that geography is no longer a subject that any one can teach without either thought or previous training. With the ever increasing number of teachers interested in the problem and working at its details, it is surely surprising—to use a mild word—that so little attention is given to it at teachers' gatherings, while so much attention is given to the untried and unproved phases of subjects suggested as valuable additions to school work. Here is a field of work for all interested teachers of geography, and especially for those who believe that the subject has much to offer which their less fortunate fellow workers should at least be given an opportunity to know about. Let us have more public discussions of the problems of teaching geography, for it is an inexhaustible field of richness that all should know.

THE STORING OF TOPOGRAPHIC AND ROLLED MAPS

By FRANK CARNEY
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THE storing of topographic maps is a problem. A satisfactory method should admit of proper cataloging and of systematic arrangement, should make it possible to get at any map with a minimum expenditure of time, and should protect the maps from undue wear in removing from and returning to the cabinet, and from dust. Large flat maps, like coast survey and other charts, and rolled maps, require the same attention.

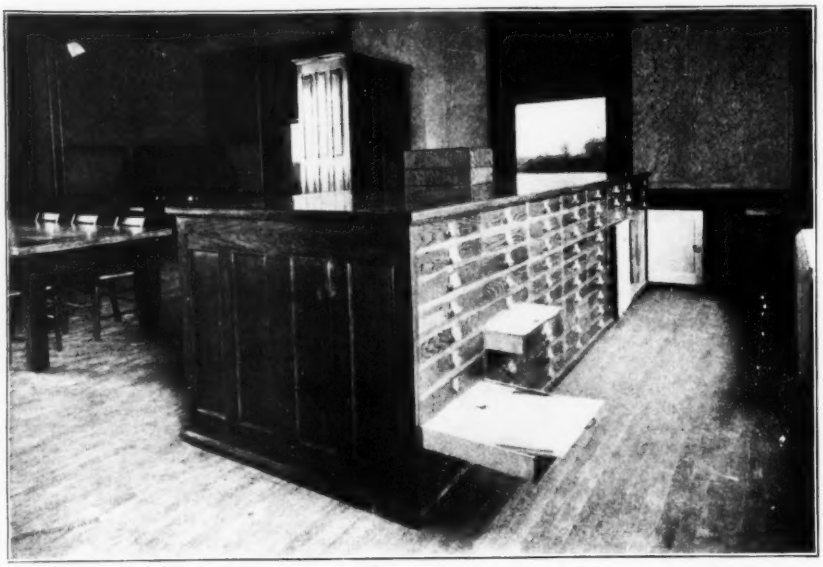

FIG. 1

A paramount matter in most laboratories is space, consequently a description of cabinets adapted to the physiography laboratory of a particular institution can be only suggestive for others.

A topographic map-filing cabinet designed to satisfy the above conditions is shown in Fig. 1. This cabinet is 13′ long, 40″ high, and 50″ wide. It contains 130 drawers with an inside measurement of 17½″ x 21″ x 2¼″, three larger drawers, and two compartments for storing atlases. I mount all sheets on muslin before filing them; the useless portion of the border is first trimmed off, so this size drawer houses conveniently all regular sheets; the special sheets are filed in the large drawers.

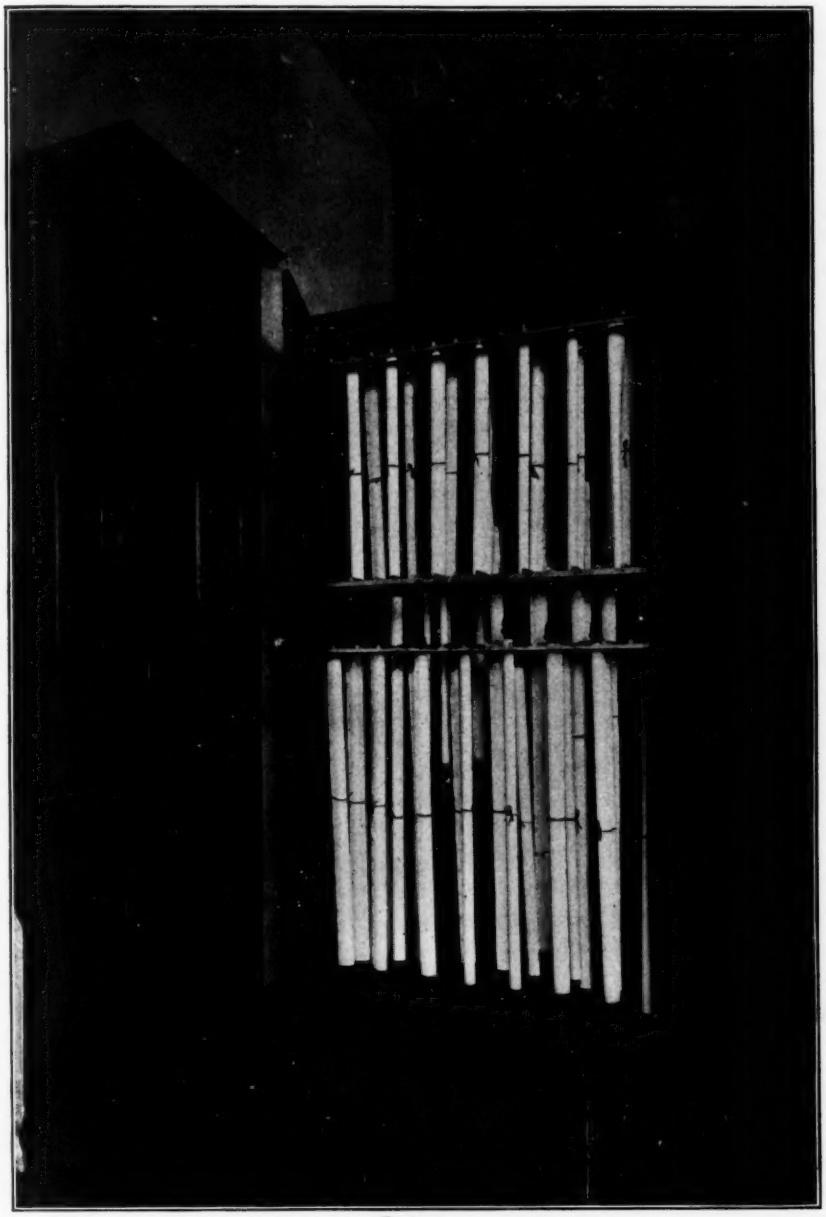

FIG. 2

The drawer, when pushed into the cabinet, is a closed box, as is shown in the cut. The three-ply cover, which may be pushed back as the drawer is pulled out, fits into a groove on the sides and front, and makes fairly dust-proof joints. To facilitate getting at the maps each drawer has a false bottom, also of three-ply construction, with a vertical strip fastened to its back end to hold the sheets in place; this false bottom may be raised by a strap to the top of the front of the drawer and drawn forward; with this arrangement one can easily find the sheets desired.

The doors at the farther end of the cabinet belong to a space for folios; by vertical partitions this space is divided into several lettered compartments, each holding conveniently fifteen folios. The card index gives the compartment and the number, 1 to 15 from left to right, of the folio desired.

Most laboratories use many rolled maps made by combining adjacent topographic sheets. Fig. 2 shows one method of storing these maps. The inside measurements of this cabinet are 7′ 6″ x 4′ x 2′ 4″; on either side of its longer width are double doors. As at present arranged this cabinet stores rolled maps of four lengths. The shelves are solid, but contain regularly-spaced countersunk holes in which the ends of the maps stand; a framework above made of half-inch molding provides rectangular openings corresponding to these countersunk holes. Each map has a particular shelf, row, and number for cataloging. I prefer this vertical position for rolled maps to horizontal storage where several are pushed into a compartment, both because more convenient to get at and less wearing on the maps.

These cabinets were made to my order by the Pratt-Kirk Company of Newark, Ohio.

Mr. G. R. Mansfield, for several years instructor in geology at Harvard University, has been made Assistant Professor of Geology at Northwestern University, where he takes the place made vacant by the retirement of Professor J. W. Golthwait. Professor Golthwait goes to Dartmouth College as Professor of Geology.

Professor W. M. Davis of Harvard University has begun his lectures at the University of Berlin, and Professor Albrecht Penck of the University of Berlin has opened his course at Columbia University, New York City. He is giving a series of public lectures on Wednesdays at 5 P.M., on the Physiography of the German Empire.

ORIENTATION OF MAPS[1]

By F. P. GULLIVER

Objects of Paper

FROM a study of the present conditions in elementary schools, the writer has come to the opinion that one of the fundamental difficulties in obtaining a clear idea of what a map represents lies in the fact that many of the maps first shown pupils have various orientations. He believes that if the north point on all maps were always placed at the top of the page much less difficulty would be experienced in teaching pupils to realize clearly that a map represents a certain definite portion of the surface of the earth.

If all maps followed the same rule in regard to their orientation there would be fewer adults who would say, as so many do to-day, "Oh, I can not use a map, for it does not mean anything to me."

Children are taught their letters and are then taught to read words on the printed page. Children are also taught musical notes by ear and are then taught to read these musical notes from the printed music. In the same way children should be taught to see a certain portion of the surface of the earth, and then should be taught to read similar facts from printed maps. Books are printed with a definite orientation of letters and words; music is also printed with a definite relation to five lines of the staff; maps should likewise conform to the definite rule of position on the page. The child may then be taught that he would see the surface of the earth as it is represented upon a map, if he looked down upon it as a bird would do in flying through the air from the south to the north.

Early Maps

When the idea prevailed among men that the earth was flat, maps were drawn of the known portions upon sheets of the most convenient size to show what was desired. Some early maps were represented with the east at the top. An example of this is the Mappe-monde of Albi, the earliest mappe-monde now in existence. It illustrates the cosmography of Julius Honorius and of Orosius in a manuscript of the eighth century. It is a poorly made sketch with mistakes in relative geographic position of countries. (See Beazley, *Dawn of Modern Geog.*, I, 1897, 385.)

The Leardo Map of 1452 has the east at the top of the map and the south at the right hand of the observer. *Bull., Am. Geog. Soc.*, XXXVIII, 1906, 366.) These maps were thus oriented because the inhabitants wished to put Jerusalem at the top of the page. The inhabitants of portions of

[1]Read before the Association of American Geographers, January 1, 1907: Reprinted from Bulletin of American Geographical Society, September, 1908.

Asia lying east of Jerusalem, if their ideas of the world were based on Jerusalem as the great historical center of thought, made maps with the west at the top. Peoples living to the south with the same idea would have had the north at the top.

The Arab cartographers placed the south at the top of the page (Santarem, 1849, I, 421); and the Egyptians oriented their maps in the same way, as is proved by a map of the time of Seti I, described in Delegeur's *La cartographie chez les anciens.*

There are some early maps of portions of North America with the west at the top. This arrangement probably resulted from the fact that the explorers traveled from the east to the west. They consequently represented what they saw as if they were moving from the east to the west over the land. An example is the sketch map of Boston Harbor in 1689, attributed to Captain Cyprian Southake. This map has the names of the islands in the harbor and most of the points of land surrounding the harbor, so that they may be read when holding the map with the west at the top. The title of the map and the large letters BOSTON HARBOUR are printed in the Fitzhugh copy, 1694, to read when holding the north at the top, while the three names Boston, Sentenall hill, and Charles Towne are printed so that the map must be held with the south at the top in order to read them easily.

MAGNETIC NORTH ORIENTATION

Nordenskjöld (*Periplus,* 1897, 45-50) says that the use of the compass was known in China 2,000 years before the Christian Era, as there is a record of magnetic cars used at that time. The art was lost and was rediscovered in the third century A.D. In Europe the first record of the use of the compass was about 1200 A.D. Wind-roses placed on maps to show the points of the compass were seldom used before 1500 A.D. After this date, however, their use became common. The first map showing both true and magnetic north was made in 1530.

Where the variation of the compass is slight, magnetic north orientation gives a near approach to the true north orientation. In regions where the variation of the compass is great this method resulted in the production of maps with an approximate northwest or northeast orientation.

As the fact became known that the compass did not point year after year to exactly the same point, there grew up the idea that some more fixed standard must be used for the orientation of maps.

TRUE NORTH ORIENTATION

With the evolution of the idea that the earth was approximately a sphere rotating with a comparatively fixed axis pointing nearly to the north

star, the present method of orientation of maps was developed, and we have on many old maps the double north point, showing both true and magnetic north.

There seems to have been formerly no uniformity in regard to the use of an arrow with two wings for true north and an arrow with one wing for magnetic north. This method is now generally used by map makers. Thus, on recent maps the true north is shown by an arrow-head with a black wing on each side, and the magnetic north is shown by an arrow with a black wing on one side only, this wing being placed on the side of the line corresponding to the variation of the needle. Thus, if the magnetic needle points to the west of the true north, the black wing will be on the left of the line; on the other hand, if the needle points to the east of the true north, the black wing will be on the right of the line.

Deeds and Plans

Many deeds and plans, even at the present time, are drawn with no reference to the meridian, or, at least, have the meridian put in apparently as an afterthought. There is a strong tendency among engineers in large cities at the present day to require all deeds and plans to have a true north orientation. This makes it very much easier to compare various deeds and plans. It would, therefore, be a great saving to the business interests of the world if all schools taught geography with maps which were universally oriented with the central meridian parallel to the right and left hand sides of the page.

Map Representation by Children

The writer has tried in a number of schools the experiment of asking children who have just begun the subject of geography to draw a portion of the immediate surroundings of the school with which they are personally familiar. In some cases these children have been told where the north and south line lay with reference to the building. In other cases they have been told nothing about orientation. The results of these experiments have been exceedingly interesting, and the author has come to a tentative conclusion in regard to the ideas developed in the child just beginning the study of geography.

Children apparently have no fixed point of orientation which guides them in drawing a map of a known area. They are nearly as likely to put the east or the west at the top as the north. They very seldom place the south at the top. Even when they are told where the north and south line lies in the schoolroom, they are generally unable to draw with correct orientation a map of a few streets which they know intimately. It is

necessary to teach them by repeated trial and correction to orient themselves with reference to the mid-day line established by the shadow of a tree, a pole, or the edge of a building.

Educational Value of Orientation

When children have been well taught to orient themselves with reference to the mid-day line of the school in which they are studying, they show a marked improvement in the percentage of correct orientations in drawing a new map. In all the experiments made by the writer these new maps have been of portions of the immediate neighborhood of the school with which the children were familiar.

When young children are taught early in their study of geography to orient themselves in their immediate neighborhood with a true north and south line, and when these children are shown no maps except those which are thus correctly oriented, the writer is of the opinion that the percentage of people who are able to use maps intelligently will be very largely increased.

In our modern life, with its strenuous activities, any method of education which tends to increased efficiency is of high value. A child trained in our modern schools must be able to read quickly the printed page; he must also be able to read and sing musical notes; likewise he should be able to read intelligently and quickly any map which is presented to him for use or study.

A Tropical Railroad Fighting Weeds.—The railroad from Guayaquil to Quito, which was recently completed, runs for 80 miles on the tropical lowlands before beginning its climb into the Andes. "The tropical vegetation of foliage and weeds along the roadbed is so very luxuriant that the railway company has found it necessary to erect a plant midway in the hothouse belt for preparing and distributing, by a process of spraying, a solution composed of arsenic and niter. By means of vats and steam-pipes the ingredients are boiled and dissolved into a strong solution, which is drawn off into a large tank, similar in construction to a regular railway water tank, from which the spraying car is filled. When the rainy season opens, the weed-killing plant begins its operations, spraying the roadbed at regular intervals. This is a very interesting feature of tropical railway operation."—Pepper, *Panama to Patagonia,* p. 65.

GEOGRAPHY AT YALE UNIVERSITY[1]

By ISAIAH BOWMAN

THERE occasionally appear decidedly pessimistic and misleading articles upon the state of geography instruction in American universities. Were such articles published in obscure journals by irresponsible people they would not call for refutation. As a matter of fact they appear in the columns of the leading educational magazines and are prepared by writers some of whom stand high in the educational world. The appearance of such an entirely erroneous article a year ago, led to the preparation of a short reply by the present writer in which actual facts were presented as they appear in the catalogues of the various universities. It seemed best to the Editor, however, to make the reply more extensive and at his request I present the following facts concerning the work in geography at Yale. These facts will be taken chiefly from the President's Report for 1907-08 and from the general catalogue of the University.

"The development of geographic instruction at Yale is interesting as illustrating the growth of an idea and the solution of an educational problem. For some years previous to 1872, Physical Geography was taught in the Sheffield Scientific School by Professor D. C. Gilman, later President of Johns Hopkins University. The work was continued by Professor Brewer until 1898, when the classes in both Scientific School and Yale College were transferred to the Professor of Geology, who taught the combined work until 1904. The subject as taught from 1898 to 1900 included two subdivisions: (1) 'History and development of land forms into their present condition as natural scenery,' and (2) 'The effect of territorial features and climate upon the human race.' The ground to be covered was so extensive that a division was planned, and in 1900 a course on 'Environmental Influences on Man' was introduced into the curriculum. In 1900 the course on 'Environmental Influences' was changed to 'Commercial Geography,' and consisted of a study of 'The conditions of human life as affected by natural environment.' In 1903 Physical and Commercial Geography were combined as a three-hour course and offered to Sophomores. In this form the study of the relation of man to his environment has continued to occupy an important place among the electives at Yale, and courses of similar nature are being widely introduced elsewhere. As now arranged, the subject matter of the older style Physical Geography is retained and much enlarged, the physical factors controlling man's development and his adjustment to these factors receive adequate treatment, and description of peoples and countries is provided for."

[1]This is the first of a series of articles on geography at the larger universities to appear in succeeding numbers of the JOURNAL.

In the conduct of this work it has been the policy to coöperate with other departments in the University. The instructor in physiography gives a course in Forest Physiography to the first-year graduate men in the Forest School, a class of over thirty students. The course in Physical and Commercial Geography is given partly in this department, partly in the Department of Social Science, and is designed to be of value in the Departments of Economics, Anthropology and History.

The influence which the geography instruction exercises in the University may be at least partially judged by the number of students who elect the geography courses. The course in Physical and Commercial Geography is elected each year by about two hundred Sophomores who meet in eight divisions and are taught by seven different instructors. This is the beginning course in Geography and is followed by courses in Regional Geography. The first course offered in Regional Geography at Yale is listed in the catalogue for 1906, thus making it among the first offered in any American institution. The work begun that year has been enlarged until it includes the Geography of North America, Geography of South America, Geography of Asia, and Geographic Controls in History.

In these courses the unit of study is the natural region—a term employed in the sense in which the School of Geography at Oxford has employed it and incorporated the idea in its courses for some years—to indicate a portion of a continent having an essential unity of physical conditions, orography, climate, etc.; and a corresponding unity of life responses, whether of plant, animal, or man. Inasmuch as the current geographic references in newspapers, books and magazines are all to political and not to regional units, regional features are referred to the boundaries of political units without at the same time losing their regional significance. The physical, political and economic phases of the geography of each natural region are involved in the work of these courses, the emphasis throughout being placed upon the ontographic half of the subject.

A collateral plan steadily developed with the regional geography has been the study of "the principles of geography" and of "systematic geography" under the stimulus afforded by the thorough mastery of the geographical facts of a continent. The whole subject is so vast that safe generalizations can only be accomplished after, or at most with, careful research in a limited field.

Over one hundred students in Yale College are now enrolled in the three courses in regional geography, over sixty electing North America, a two-hour course through the year, and about forty electing Asia and South America, to each of which half as much time is devoted.

The courses of more advanced grade are those in pure Physiography and in Geographic Controls in History. These are elected by a small number of high-grade students who are engaged in professional studies. It may here be noted that in Yale College the total number of students now enrolled in geography is about three hundred and in the Sheffield Scientific School about one hundred.

Besides those courses that are primarily geographic there are given in other departments courses in subjects with a strong geographic flavor such as Transportation Systems, the Natural History of Commerce, and Colonization. These three courses enroll over seventy-five students. At least sixty-five of these are not already counted in the strictly geographic courses.

A phase of development to which a great deal of attention is being paid is the growth of a suitable collection of geographical material, not only in the department but in the University Library. The latter has had its effectiveness greatly increased by a new shelf arrangement of the geographical books whereby the material for any country may be scanned with great ease. The fine and unusually large collection of South American books, manuscripts, and maps recently presented to the Library by the Lecturer on Latin American History makes possible for the first time a serious library dependence on the part of the class in South American Geography. The geographical material in the department—maps, pamphlets, slides, and books—has increased through gifts and purchases until it is now fairly well adapted to the different instructors' immediate needs in teaching and research. It represents also the combined private libraries of the instructors and is available at any hour to any member of the department.

Considering the period in which modern geography has been offered at Yale, 1900-1908, the growth as expressed in the number of courses, in students enrolled, in number of instructors, and in methods of teaching, is gratifying indeed. Nor can one who seeks to discover the true state of geography in America leave out of consideration the plans for further geographic development in our universities. Plans for the immediate future at Yale involve the development of courses in regional geography until there are instructors who are authorities on the geography of each of the continents. This will eventually involve the erection of a separate department of geography, whose instructors will not only offer courses but will, with advanced students, conduct explorations in the less known parts of the world, particularly those parts where the character of the physical features has been a prominent factor in the life of a race.

ECONOMIC NOTES

By EDWARD VAN DYKE ROBINSON

WOOL MANUFACTURING IN FRANCE.—A recent report published by the Bureau of Manufactures indicates that the wool manufacturing industry which is localized along the Belgian border in France is making no progress, if, indeed, it is not losing ground.

It appears that coal is imported to some extent, although the Anzin coal field furnishes part of the supply.

Textile machinery is also imported and costs considerably more in France than in Germany or Belgium. The French workman also receives higher wages than are paid in Belgium or Italy. For all these reasons, the industry is limited and is now dependent in the main on the British market.

Around Cambrai, the hand loom industry still survives, but appears to be losing ground in favor of the lace industry. That French mills are able to maintain themselves at all, is due solely to the high artistic taste of the French designer.

A NEW RAILWAY IN GREECE.—It is reported that the railway from Athens to Saloniki will be completed and taken over by the Greek Government early in 1909. For the first time, Greece will then have railway connection with the rest of Europe. There are some who think that as soon as such a connection is established, the Piraeus will become the mail and passenger port of Western Europe for India and the far East in place of Brindisi.

THE RUBBER MARKET.—The financial depression in the United States during the last year has had far-reaching effects. One of the most curious results has been the marked fall in price of rubber. This fall has rendered the collection of rubber unprofitable in many of the internal parts of Brazil: and has thereby decreased the public revenues derived from rubber, to an alarming extent. It is also thought that the cultivated rubber from the East Indies has been a factor in the fall of prices. The rubber market appears to be in a more demoralized condition at present than at any time since the introduction of rubber tires for automobiles.

THE NEW TRANS-CONTINENTAL RAILWAY IN CANADA.—The Grand Trunk Pacific Railway of Canada, which is to form a new trans-continental line, has been completed from Winnipeg to Wainwright, Alberta, a distance of 666 miles. This road is to go through the Yellow Head Pass, which will give a lower summit elevation than the Canadian Pacific or than any road in the United States.

FLOUR MILLING IN THE UNITED KINGDOM.—The Bureau of Manufactures has a special agent at present investigating the flour milling indus-

try in Europe, especially in the United Kingdom. It appears that, in spite of the handicap of the damp climate, an immense milling industry has been established around Liverpool and other parts of Western England. The flour is, for the most part, of high quality and by reason of having a supply of wheat from many different countries and at all times of the year, the British miller is enabled to compete successfully with the American miller. The export of American flour to Western England has fallen off about one half in twenty years. The special agent, Mr. Davis, thinks that with more care in milling and with more regular and speedy delivery of the flour the American miller can regain a part of this lost ground. The fundamental difficulties, however, are two: (1) The fact that the by-products are much more valuable in Europe than in the United States; (2) the fact that wheat can be handled and shipped in bulk with less trouble and expense than can any sort of package freight.

It is difficult to see how these economic conditions can, in the long run, be offset.

Tobacco in Italy.—The manufacture and sale of tobacco has been a state monopoly in Italy since 1883. Hitherto, only about one fourth of the tobacco consumed has been grown at home, the rest being purchased through government agents, a large part of the imports being of American tobacco, especially from Kentucky and Virginia. The rise in price for these grades of tobacco, however, has stimulated the cultivation of tobacco in Italy. In fact, the Italian Government seems to have deliberately set about to make Italy independent of the American supply. It not only makes contracts with the peasants for the cultivation of tobacco but appoints inspectors who practically dictate every step in the cultivation and curing of the tobacco. In addition to such supervision, the peasants are given financial assistance by the government. Under these conditions, it would seem that a domestic tobacco industry might readily be created in Italy to the detriment of the American exporter; although it must be said that it is difficult to grow the same grade of tobacco in districts so far removed from one another.

The Largest Steamships in the World.—Two new steamships for the White Star Line are about to be constructed at Belfast, each 860 feet in length. The "Lusitania" and "Mauretania," the largest vessels afloat at present, measure 790 feet in length. At this rate, a thousand foot steamer is not impossible in the near future.

The new vessels are to have turbine engines like the "Lusitania." It would appear, therefore, that the turbine is a success; and also that the economy of operation due to increasing the size of the vessel renders still

larger vessels profitable. Eventually the point must be reached where increasing size will impose such strain upon the structural materials as to offset this economy of operation, but such a limit is not yet in sight.

TRADE BETWEEN INDIA AND THIBET.—Since the expedition to Lhasa, under the command of Col. Younghusband, an active trade has sprung up between India and Thibet. The staple export from India to Thibet is wool, some of it being trans-shipped to Boston and New York.

THE MANCHESTER SHIP CANAL.—The Manchester Ship Canal has been deepened to 28 feet, thus enabling practically any vessel which comes to Liverpool, to go up the canal to Manchester. The fact that such an immense undertaking should prove successful not only in the engineering but in the commercial sense, is striking proof of the superiority of ocean transportation. So great is the advantage enjoyed by cities with direct access to the ocean that many industries show a distinct disposition to migrate to salt water. This migration can be checked, in many cases, only by bringing the sea inland.

ORANGES AND PINEAPPLES IN CUBA.—During the last few years, many fruit plantations have been established in Cuba under American control. During the last pineapple season, which closed in July, it is said that nearly one million crates of pineapples were shipped to ports in the United States. Oranges and vegetables are also being extensively cultivated. According to the estimate published in the Consular Reports, the citrus fruit plantations of Cuba are capable of yielding a crop which would require 160 steamships carrying 25,000 crates apiece, to deliver the fruit in the United States. If this estimate is even approximately correct, it would seem that the orange growers of California and Florida may encounter severe competition from Cuba.

NEW SOURCES OF PHOSPHATE DEPOSITS.—The development of scientific farming, especially in Europe, has created a constantly increasing demand for mineral fertilizers. Recently new phosphate deposits have been discovered on various islands of the Pacific Ocean. It is said that Ocean and Pleasant Islands in the Gilbert Group contain fifty million tons. There are also considerable deposits on Christmas Island and on three islands of the French colony of Tahiti. More recently, a new deposit has been found on the island Angaur, one of the group which was sold to Germany by Spain at the close of the Spanish-American War. This discovery is considered especially important as the only large German deposit of phosphate, the one in Nassau, is nearly exhausted.

THE GHENT-NORTH SEA SHIP CANAL.—Within two or three months, the city of Ghent will be connected with the North Sea by a ship

canal which will admit vessels of 25 feet draft. The total distance of twenty miles between Ghent and the sea will be lighted with electric arc lights. The canal itself will have a depth of 28½ feet so that still larger vessels can be accommodated by enlarging the locks.

THE CAMPHOR TREE.—In spite of the discovery that camphor can be made in the chemical laboratory by synthetic processes, which would, it was thought, render the collection of camphor from trees unprofitable, the natural camphor industry shows little sign of decadence. This may be due to the constantly increasing uses which are found for camphor. In this connection, it is interesting to note that the camphor tree has been found to flourish in Florida and that considerable plantations have already been established there.

COFFEE AND SUGAR GROWING IN PORTO RICO.—The report of Porto Rico Agricultural Experiment Station for 1907 indicated that the decline of the coffee industry in Porto Rico still continues, owing to the fact that the United States buys very little Porto Rico coffee, while, on the other hand, it is heavily taxed in Spain since the Spanish-American War. This seems a most unjust situation. Moreover, the coffee industry in Porto Rico was the mainstay of the small white farmer of the uplands. On the other hand, the sugar industry, which has received such an impetus since the American occupation of the island, is found on the lowlands, and means great estates worked by negro labor. The destruction of the coffee industry and the growth of the sugar industry thus promise between them to Africanize the island of Porto Rico much as Hayti has already been Africanized.

THE CHINESE PORT OF TSINGTAU.—When the Germans occupied the Bay of Kiao-chau and established the port of Tsingtau in China, they did so with the idea of building up there a great commercial port which should rival Hong Kong on the south. While this great plan has not yet been carried to fulfillment, the port of Tsingtau has already drawn the trade which formerly went by way of Chefoo, and since the completion of the railroad to the Hoang-ho river, the hinterland of the port is continually extending. Tsingtau must now be reckoned one of the coming ports of China.

NOTES

WHY TEACH HOME GEOGRAPHY.—The chief value of "home geography" or the study of the earth's surface at first hand is: (1) The child thus comes to interpret maps intelligently, for maps to a child properly guided in the exploration and study of his neighborhood are not things in themselves, but are merely representative of surface features of the earth. (2) The study of home geography incidentally includes much wholesome nature-study. (3) It gives a stock of experimental knowledge or sense-impressions out of which to build mental pictures of the far-away things which require an exercise of the constructive imagination in order to conceive of them rightly; and without this stock of sense-impressions the imagination has no material out of which to build pictures, for the imagination is not creative. We can not imagine anything essentially different from what we have seen, heard, felt, tasted or smelled.

An intelligent use of pictures will help greatly in this field. Without pictures it would be practically impossible to give the children of North Dakota an adequate conception of a mountain or of a seashore, while the children of Florida need the same kind of help to conceive of snow drifts. The knowledge of a cornfield comes in the same way to the children in Manitoba. The pictures in the text-books in geography are not merely to embellish the pages; they are most valuable means of assisting the pupil to see in his mind's eye things which mere verbal description would not make so plain.

Those who live in the middle temperate regions are most fortunately situated for teaching geography. A climate which gives all the changes of four seasons and a landscape presenting the variations of hill, plain, forest, river, lake, etc., has the elements out of which to construct a notion of all lands. The lake extended by imagination until we can not see across it, and with waves greatly enlarged, will stand for an ocean view; a magnified hill becomes the mountain for purposes of illustration. A cold day in winter, intensified, with snow drifts exaggerated, is a sufficiently realistic picture of the arctic regions, while a bit of hard, naked or stony surface with the rays of the sun beating upon it, running its temperature up to 100°, is a good enough nucleus from which the mind may evolve a notion of a desert.—From *The Western Teacher,* October, 1908.

GETTING AT THE ESSENTIALS IN GEOGRAPHY TEACHING.—For years —so many that the memory of man knoweth not—we have always taught the youngster at his first lesson, "The earth is round, like a ball or an orange." Now there is certainly nothing heretical to my notion in this

statement; although to the many who insist that the study of geography should begin in the school yard, the idea of beginning with a round world will be highly illogical. Why the earth should be compared to a ball is plain, but why comparable to an orange is not quite clear; moreover, it is not very logical. I should rather say, "The earth is round, like this"—"this" being a small globe that is a minature earth; and because it is a representation of the earth, "this" is a more logical illustration. But unfortunately, after having compared the shape of the earth to that of the ball or the orange, we ever afterwards teach a most hopelessly flat earth. The round earth is not in the course of study; why, therefore, should the youngster bother about it?

If the shape of the earth is a fundamental fact in the study of geography, the pupil must be taught to think in terms of a round earth. This he can do best when the miniature earth is in his hands, to the exclusion of other devices. He is taught that "three quarters of the earth's surface are water and one quarter is land." With a little exercise of ingenuity on the part of the teacher the pupil may be led to discover the proportion from a globe; but from a flat map, never. He might have some difficulty in comparing the relative position and sizes of continents, or of grand divisions or even the globe, or minature earth, but he could not make the comparison on a map with any degree of accuracy at all.—From *Education,* October, 1908.

It is a very common practice to blame the grade teacher for the shortcomings of geography teaching. Doubtless she is far from perfect. But in an experience that has been acquired by observing the personal work of grade teachers in nearly five hundred schools in different parts of the country, I am forced to the belief that she is doing her part of the work better than those who lay out her work are doing theirs. And why should she be either capable or possessed of world knowledge? She is taken immediately after graduation from the high school or the normal school into the classroom to practise on others the vicious system that the year before was practised on her. At the time when she begins work in the schoolroom, her knowledge of the subject is limited to what she has learned in the text-book she studied; possibly at a normal school she received instruction in the proper method of teaching a subject of which she had been taught nothing. After she is in harness she is occasionally instructed by lecturers whose chief aim is to convince her that whatever she does is wrong, anyway. Her world-wisdom, the knowledge that can be acquired by observation only, and her experience in travel, are *nil;* under these circumstances she does her work surprisingly well. But can the same be said of those who, knowing all these facts, require her to do the work cut out? Are

her shortcomings her own fault wholly, or are they in part those of John Doe higher up?—From *Education,* October, 1908.

GEOGRAPHICAL DISTRIBUTION OF POPULATION IN THE UNITED STATES.—As far back as 1903, the census office published Bulletin No. 1, entitled Geographic Distribution of Population. It was prepared under the supervision of Mr. Henry Gannett, United States Geographer. From the geographer's standpoint it is an unusually interesting bulletin, yet it seems to have escaped extended notice. The tables of statistics and the conclusions drawn from them are very suggestive.

The first table shows that 95.7% of our population live in the country which is drained to the Atlantic Ocean; 53.4% in the region drained to the Gulf of Mexico; 43.9% in the basin of the Mississippi; 3.8% on the Pacific slope; 0.5% in the Great Basin.

Table No. 3 shows that only 2 negroes in 1,000 live outside the region which drains into the Atlantic.

Other tables show that two-fifths of our population live between 500 and 1,000 ft. above the sea; three-fourths live below 1,000 ft.; nine-tenths live below 1,500 ft.

The tendency of the negro population to live in the very low lands is shown by the fact that nearly one-half of them live below the 500-foot contour.

Table 10 shows that, while the average density of population of the country as a whole is about 26 persons to the square mile, yet the "New England hills" province has 124 to the square mile. This province is made to include New York City. The Appalachian Valley is next most densely populated, having 83 to the square mile. The Great Plains have a little more than 2 to the square mile, while the Great Basin has less than 2.

In point of latitude, the belt lying between the 39th and 42d parallels is most densely populated. In this narrow strip live nearly two-fifths of our entire population. The 42d parallel forms the northern boundary of Pennsylvania, and 39° is the latitude of Washington, D. C.

In point of longitude, seven-eighths of the people live east of the 96th meridian, which divides the United States proper in the middle. The tables further show that the region which has an average annual temperature between 45° and 65° contains more than four-fifths of the people.

Two-thirds of the people are grouped in the area which receives an average annual rainfall of between 30 and 50 inches. Only 3.4% live where the rainfall averages below 20 inches a year, the minimum rainfall for successful agriculture without irrigation.

The facts brought out in this bulletin show how very strongly certain geographical influences affect the distribution of people over our country.

R. H. W.

CONCENTRATION OF INDUSTRIES.—The building of a great industry in a region, or in a specific center, modifies in important ways the distribution of population. The United States abounds in illustrations of this principle. Such gatherings arise in relation to natural resources, such as combinations of soil and climate. Indian corn may be termed a prairie product, although widely distributed beyond the prairie region. Hot summers and wide areas of fertile soil have led to such enormous production of this crop in Illinois, Iowa, and adjoining lands, that it may fairly be cited as an example of concentration even though other grains are largely grown. The live-stock industry follows the corn, though by no means coincident with it, since the natural pastures of the plains reach far beyond the corn belt. The oranges of Florida, or California, the peaches of Niagara, the grapes of Chautauqua, and the fruits and vegetables of the Atlantic coastal plain offer further examples.

The Cordilleran States abound in groups of population centered around a single industry, usually agriculture or mining, and the one is as striking and conspicuous as the other. If the rush of people for gold in California was spectacular and dramatic fifty years ago, the concentrations due to fruit and grains are scarcely of less absorbing interest in the central valley of the San Joaquin and the Sacramento at the present time. The Willamette Valley in Oregon, the plantations of Utah, and the farms about Greeley, in Colorado, afford noble examples of agricultural concentration in a region where deposits of silver and gold are more commonly remembered as explaining the origin of population groups.

Concentration due to mineral resources is well typified by Pittsburg, where, however, facilities for transportation and relation to other important centers must not be forgotten; or we may turn to the Southern Appalachian Valley, where coal and iron are the dominant factors, supplemented by agricultural conditions of a high order.

Resources in the form of power have played a most important part, and perhaps our most available illustration is southern New England, where the streams and waterfalls were obviously and instantly available in a time when coal had not been exploited, and when there were no transportation facilities worthy of the name. Water power determined the industry and the dense populations of that region, even though fuel power now plays so large a part, and other interests enter in to baffle analysis.

Resources of mine and soil must always combine with favorable transportation. Pittsburg has been cited, and Cleveland, Buffalo, and New York, among others, might be studied with the utmost profit in this connection. The products may be of remote origin, as are the iron and the grain in relation to Buffalo, but the concentration is sure, if the site is in the track of inevitable movement, as determined by grades, navigable waters, and by the position of other growing groups of population.

When a great center has been established in response to such conditions of environment, then the needs of the population enter as a further factor to react on environment, and give color and character to all surrounding life. Thus the agriculture of New York and New England has been modified, not only by competition from without, but even more profoundly by the needs of New York and Boston. The single requirement of dairy supplies for these cities largely controls the agriculture for a radius of 300 miles. The growth of these cities, the perishable character of the product, and the imperative needs of millions of people, have almost revolutionized the farming of these regions within a single generation.

—From *The Geographical Journal,* October, 1908.

REVIEWS

How We Travel—A Geographical Reader. By James F. Chamberlain, pp. viii+227. New York, The Macmillan Company, 1908.

Chamberlain's How To Travel is a companion volume to his How We Are Fed, How We Are Clothed, and How We Are Sheltered, and is adapted as a geographical reader in the intermediate grades. The field covered in the book under review is more capable of definite and unified treatment than was the case in the previous volumes in the series. As a result, the book is extremely satisfactory as a supplementary reader. The methods of travel in different countries are described briefly and clearly. Very little attention, however, is given to the transportation of commodities and no mention is made of human porterage—an important phase of transportation in the world as a whole.

Practical Exercises in Physical Geography, pp. xi+148. With index (and an important introduction); and Atlas for Practical Exercises in Physical Geography, pp. 50, plates 45. By W. M. Davis, Professor of Geology in Harvard University. Ginn & Company, 1908.

Physical Geography contains so many varied objects of study that a course in it may be made interesting and enlivening without supplying any real training whatever in scientific habits of thought. Laboratory work has therefore been widely introduced in recent years to achieve, if possible without loss of interest, accuracy of thought and expression, and to convert Physical Geography into a more disciplinary subject for study. The laboratory manuals so far issued have, in general, consisted of short series of questions, more or less cleverly devised,

and based upon topographic maps of the U. S. Geological Survey and the daily weather maps of the Weather Bureau.

In Professor Davis' "Practical Exercises in Physical Geography" and the accompanying Atlas we have by far the most ambitious and worthy laboratory guide yet devised. The text and atlas bear evidence upon every page of the "long and laborious task" which the author acknowledges the preparation of them to have been. It is safe to say that to a mind less confident of the outcome and less conscious of the urgent need for serious exercises, if any at all are attempted, this would indeed have been an appalling if not an impossible task. We have at last a laboratory guide in Physical Geography as thorough in its treatment of land forms as the best laboratory manual in the physical sciences. The distinguishing feature of the Atlas is the large number of block diagrams of landscapes in successive stages of land development. In the execution of these expressive diagrams an astonishingly clear and graphic quality has been attained. And by eliminating irrelevant details they are made to express definite problems in standardized form. We have nowhere seen a plan which promises so successfully to achieve the commendable result at which Professor Davis aims. This he states to be to direct the student's mind to and detain it upon "each feature of a complicated fact, each step of a large problem, in order that the facts and problems may reach his understanding and remain in his memory." A further paragraph in the preface is noteworthy because of the happy correspondence between plan and result: "The careful performances of the Exercises will lead the pupil to observe, to describe, and to generalize; to make inferences, to invent explanations, and to test theories; to express new ideas both verbally and graphically."

While the block diagrams and the problems based upon them are of the high order indicated we can not approve, without qualification, all of the 19 topographic maps included. These appear to us to have two serious defects. Quite too few a number of land forms are illustrated considering the abundance of excellent map material available, and several of the maps are badly done. It is not enough to reply to the first criticism by saying that the topographic maps are cheap and a supplementary set should be purchased for every laboratory. There are a great many schools which will have those in the text and the atlas or none at all. If, therefore, the maps are to be published in this form at all there should be enough for the entire course. Personally we much prefer that they should appear in the text as near the description of the feature they are designed to illustrate as may be. The same would be said of the block and other diagrams were it not (*a*) that they are ideal cases which at first are better regarded separately from the discussion of actual cases in the text, (*b*) that they are unavoidably of such size as to make it impracticable to include them in the text, and (*c*) that many of them are spoiled for future use by completing them in the laboratory and if included in the text would necessitate the purchase of a new text instead of the less expensive atlas.

The second criticism applies specifically to those topographic maps marked Plate 37, Figure 4, and Plate 36, Figure 1. By the elimination in the first case of all but the 250-ft. contours the highly expressive Cucamonga sheet is transformed into a dull, characterless map. In the second case the same omission, together with the slight representation given to the plateau surface, has made the canyon

wall a weak, unimpressive feature. The scale allows of the representation of all the contours which are really necessary to make the map sufficiently graphic. To be sure no trained map reader would need to have this graphic quality achieved, but the beginner does need all the assistance of this sort that can be rendered. He can not turn from a 10-ft. contour map of a coastal plain, Plate 35, Figure 3, which really exaggerates the relief, to a 250-ft. contour map just over the page, Plate 36, Figure 1, and appreciate through the latter map the Colorado Canyon. Training in the expression value of different contours is admittedly an essential part of a course in map study but the limits are quite exceeded, we think, in Plate 37, Figure 1, where 500-ft. contours are used to express the canyon of the Tuolumne. It is only the exceptional student who would see or who could be taught to see from this map the profound feature that the Tuolumne Canyon really is. The questions in the manual (pp. 48, 49, paragraph 6) relating to the width of the valley floor of the Tuolumne and the character of the upper and lower parts of Turnback Creek can not be answered with conviction by an elementary student who studies a map with such meager contours. A surprisingly small amount of material is included to illustrate the chapter on the atmosphere and a notable quantity of this is a reproduction of diagrams already included in the text. The absence of such expressive means of instruction as temperature curves, wind roses, and snow maps, and of an adequate rainfall map, and of adequate questions relating to so important a climatic element as rainfall, are regarded as a defect even for the most elementary instruction of the High School. The last-named does not appear to us to be compensated by the well-nigh microscopic chart of annual rainfall in the Davis' Physical Geography (p. 46) and the meager text (two pages, 45-47) devoted to its amplification.

There are several considerations which the reader must bear in mind in noting the above criticisms and which the reviewer wishes to indicate most emphatically. In the first place nothing here noted is to be construed as bearing in any way upon the question of the advisability of laboratory instruction in Physiography in secondary schools. That the block diagrams are in our view inexpressibly superior to anything we have yet seen or used or that the topographic maps and the atmospheric charts are somewhat defective neither approves nor condemns such instruction. This caution can not be too emphatically indicated. There is to-day very much doubt in certain quarters whether pure Physiography, with or without laboratory work, is the best beginning course for the High School. The correspondence and discussion concerning this subject, which were recently published in the pages of this JOURNAL, are a clear index of the divided state of current opinion. Certain it is that those who hold to the belief that it is wise to give a course either wholly or principally as Physiography will find in Davis' Exercises and Atlas indispensable helps to the attainment of solid results.

The text which accompanies the Atlas can only be reviewed in the most favorable terms. That the leading American physiographer has with great laboriousness and elaborateness set down the suggestions for map reading growing out of his long period of successful teaching should arouse the gratitude of every geography teacher, especially of every young teacher, in the educational world.—ISAIAH BOWMAN.